
Monarda humilis (Lamiaceae), a New Combination for a Species from New Mexico, and a Key to the Species of Section *Cheilyctis*

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ABSTRACT. A new combination, *Monarda humilis*, is established to accommodate one of the two species of *Monarda* sect. *Cheilyctis* that is found in New Mexico. This species differs from the other species in New Mexico, *M. punctata*, by its corolla pigmentation, leaf size, and more diminutive and gracile habit. A key to the six species of section *Cheilyctis* is provided, and evidence for specific status of several taxa is discussed.

Key words: Lamiaceae, *Monarda*, New Mexico, North America.

A study of *Monarda* L. specimens in the University of New Mexico Herbarium (UNM) in August 2001 revealed two morphologically distinct species of section *Cheilyctis* in New Mexico. They differ in several characters (see below), but the most conspicuous differences are that one has small leaves (2–4(5) cm long), corollas with the lower lip having deep purple spots and deep purple margins on a white background, purple upper lips, and purple bracts. The other has large leaves (4–7 cm long), corollas with a lower lip having purple or maroon spots and margins and backgrounds that are white or pale yellow in color, white or pale yellow upper lips, and white bracts.

The specimens of the large-leaved species are from eastern and southern New Mexico and are assignable to *M. punctata* L. Their large leaves, white or pale yellow corollas, white bracts, and broadly deltoid calyx teeth suggest they are best placed in variety *occidentalis* (Epling) E. J. Palmer & Steyermark (Scora, 1967). This variety is common in adjacent areas of western Texas and Oklahoma.

The specimens of the small-leaved species are from central and western New Mexico. There are no names available at the specific rank for the second taxon. However, Torrey (1853) described *M. punctata* var. *humilis* from a specimen collected within the distribution of the small-leaved species. He noted in the protologue that it may be a distinct species. The English description is very brief, and there is no Latin diagnosis, but the description is consistent with the small-leaved species. No sub-

sequent workers took up Torrey's name. The type of *M. punctata* var. *humilis* is fragmentary and has suffered some insect damage, but close examination of the features of the stem, leaves, and calyx determined that it is conspecific with the specimens of the small-leaved species. We therefore elevate Torrey's variety *humilis* to species rank by making the new combination below and provide a description of the taxon. We also provide a key to the species of section *Cheilyctis* and briefly discuss the taxonomy of the section. In particular we review evidence for specific status of *M. fruticulosa* Epling, *M. maritima* (Cory) Correll, *M. stanfieldii* Small, and *M. viridissima* Correll.

Monarda humilis (Torrey) Prather & J. A. Keith, comb. et stat. nov. Basionym: *Monarda punctata* var. *humilis* Torrey, Report of an Expedition down to the Zuni and Colorado Rivers 166. 1853. TYPE: U.S.A. New Mexico: no date, [S. W.] Woodhouse s.n. (holotype, GH). Figure 1.

Annual herb, rarely branched at the base, usually branched above, 15–40(50) cm tall. Stems slender, often pigmented pink or purple, especially at the base, covered in minute, unicellular, conical, downcurved trichomes. Leaves petiolate, blades 0.3–0.7 cm wide, 2–4(5) cm long, elliptical to lanceolate, usually entire, occasionally sparsely serrate, covered in minute, unicellular, conical trichomes. Inflorescence of several verticillate inflorescences in axillary positions along each flowering stem. Bracts lanceolate to deltate, usually purple on their adaxial surface, usually green on the abaxial surface. Calyx tube 4–6 mm long, with tiny unicellular trichomes scattered along the veins on the outside of the tube, and a ring of long, multicellular trichomes on the internal surface of the apex of the tube, lobes ca. 1 mm long, deltate, long-ciliate, cilia of multicellular trichomes. Corolla 0.7–1.5 cm long, lower lip with deep purple spots and a deep purple margin on a white background, upper lip purple, with short hairs and sometimes a

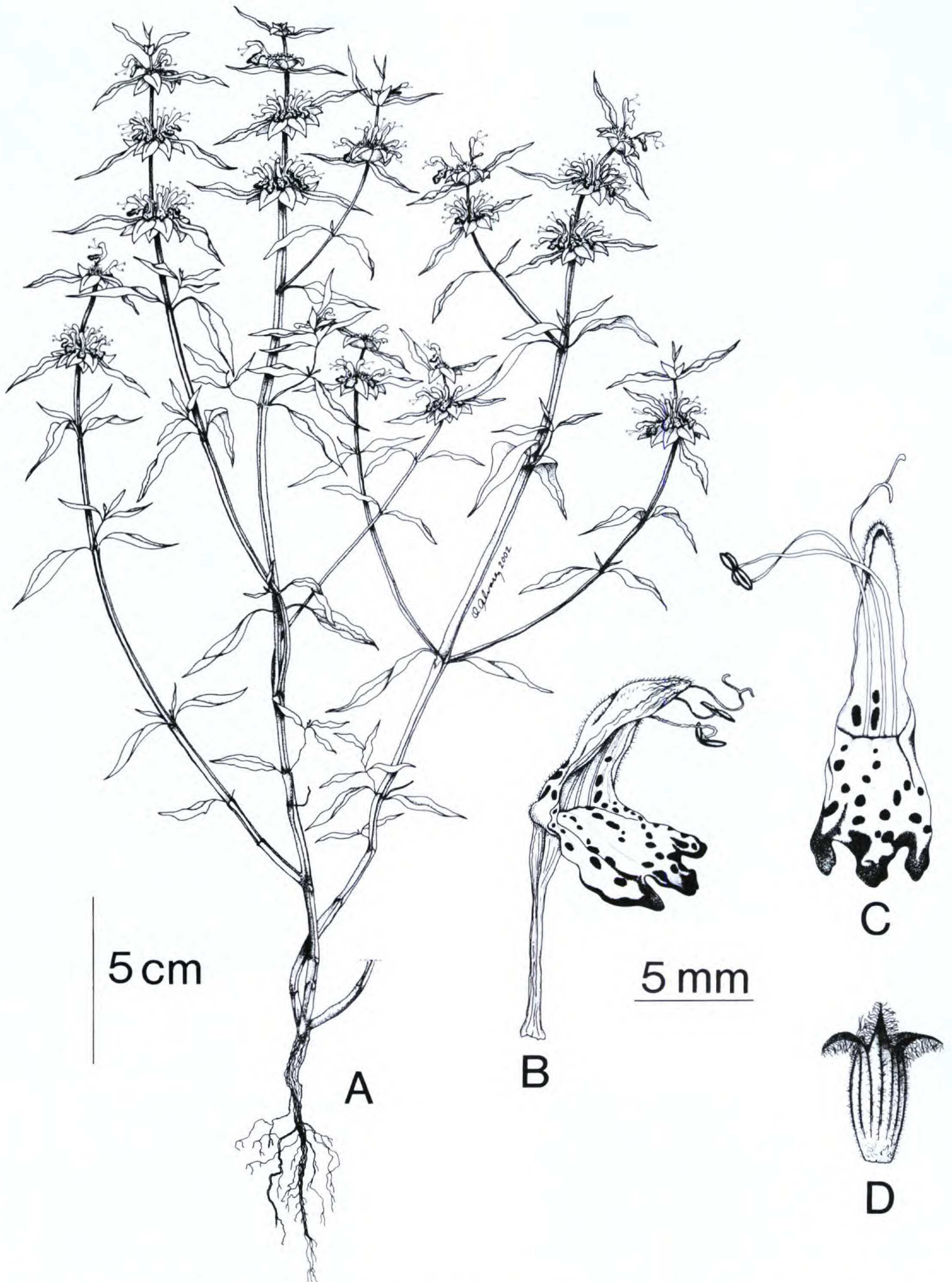


Figure 1. *Monarda humilis* (Torrey) Prather & J. A. Keith. —A. Plant. —B. Corolla, side view (detail). —C. Corolla, front view (detail). —D. Calyx (detail). Based on Wagner 1192 (UNM).

few longer ones on the outer surface. Chromosome number $n = 12$ (Ward & Spellenberg, 1984).

Habitat and distribution. Found in very sandy soil in open areas of juniper scrub or in grassy plains or dunes in central and western New Mexico.

Phenology. Flowering June through August.

The type specimen of *Monarda punctata* var. *humilis* was collected by Woodhouse on the Sitgreaves Expedition (Torrey, 1853). Most of the type specimens from this expedition are in the herbarium at The New York Botanical Garden; however, repeated searches by NY staff did not uncover the type of *M. punctata* var. *humilis*. A specimen was found in the Gray Herbarium, and after "Monarda," written in pen, the phrase "punctata humilis Torr., Sitgreaves Rep." is written in pencil in what appears to be Torrey's handwriting, based on comparison with published examples (Daniel, 1981). This specimen, thus, is assumed to be the holotype.

The major floras of New Mexico and monographs of *Monarda* recognized only one taxon from the state, though different names had been applied to it. In the *Flora of New Mexico*, Wooton and Standley (1915) listed only *M. lasiodonta* (A. Gray) Small, placing *M. punctata* var. *lasiodonta* A. Gray in synonymy. They also stated in the text that *M. punctata* var. *humilis* is likely a synonym of *M. lasiodonta*. The only taxon of section *Cheilyctis* given in *A Flora of New Mexico* (Martin & Hutchins, 1981) is *M. punctata* var. *lasiodonta*, with *M. punctata* var. *occidentalis* and *M. lasiodonta* listed as synonyms.

In an early treatment of *Monarda* subg. *Cheilyctis*, Epling (1935) listed only *M. punctata* subsp. *occidentalis* for New Mexico. In 1931 he annotated specimens in US belonging to both New Mexican species as *M. punctata* subsp. *occidentalis* (*M. humilis*: Wooton s.n., 1 Aug. 1892; Wooton s.n., 26 July 1906. *M. punctata* var. *occidentalis*: Fisher 181; Wooton 424; Wooton s.n., 14 Aug. 1895; Vasey s.n., Aug. 1881). He did not cite any specimens in the 1935 treatment, but he noted that some of these specimens were atypical and stated (Epling, 1935: 26): "The New Mexican and Mexican forms appear to have rose-purple corollas spotted with a deeper purple. They are too little known." Likewise, McClintock and Epling (1942) listed *M. punctata* subsp. *occidentalis* as the only taxon of section *Cheilyctis* in New Mexico, but they cited two specimens of *M. humilis* as examples of a "dwarf form." Scora (1967) listed *M. punctata* var. *occidentalis* as the only taxon in New Mexico, but he cited only one specimen from the state. That specimen (Vasey s.n., Aug. 1881, US) is *M. punctata* var. *occiden-*

talis. Scora listed *M. punctata* var. *humilis* in synonymy under *M. pectinata* Nuttall, but examination of the type clearly does not support that placement; the type specimen clearly lacks the long aristate calyx lobes typical of *M. pectinata* and all other species of section *Aristatae*. Torrey, in fact, noted in the protologue that the shape of the calyx teeth of *M. humilis* are "triangular lanceolate, short."

Even though the names *Monarda lasiodonta* or *M. punctata* var. *lasiodonta* have been applied to New Mexican specimens (Wooton & Standley, 1915; Martin & Hutchins, 1981), and the type of variety *humilis* is a syntype of variety *lasiodonta*, the latter taxon is best interpreted as being absent from New Mexico. While Gray's original interpretation of *M. lasiodonta* was quite broad, including plants from Arizona, New Mexico, and Texas (Gray, 1886), current authors treat *M. punctata* var. *lasiodonta* as an eastern Texas plant (Shinners, 1953; Scora, 1967; Turner, 1994), and the taxon has been lectotypified with a Drummond collection from Texas (Scora, 1967).

The two taxa in New Mexico can be distinguished by several characters, though in a few features they intergrade. *Monarda humilis* is usually a smaller, more slender plant and the specimens tend to be more pigmented with purple in general, especially in the stems, bracts, calyx, and corolla. *Monarda punctata* var. *occidentalis* is usually more robust and lacks the purple pigmentation in the stems, bracts, and calyx, and the corollas are less pigmented than those of *M. humilis*. The leaves of *M. humilis* are smaller and entire or weakly toothed, while those of *M. punctata* var. *occidentalis* are larger and usually distinctly toothed. The flowers differ in pigmentation as discussed above, and they are further distinguished by pubescence of the upper lip: in *M. humilis* the outer surface of the upper lip has only short hairs or short hairs plus a few long hairs, while in *M. punctata* var. *occidentalis* the upper lip usually has many long hairs, in addition to short hairs.

Monarda humilis can be distinguished from the other species in section *Cheilyctis* most easily by the pattern and color of its corolla. The dried flowers of this species are heavily tinted with purple, which is uncommon in the section. Flowers of other species in the section are usually yellow, pink, or white. The purple spots on the lower lip in *M. humilis* are larger and more irregular than the maroon spotting (when present) on the other taxa. *Monarda humilis* is the only species in the section that has a purple upper lip. Others may have maroon spots on the upper lip (particularly *M. stanfieldii* and many populations of *M. punctata*), but in none is

the background color purple. In *M. humilis*, the margins and tip of the lower lip are colored deep purple, while in other species the margin is the same in color as the background (white, yellow, or pink). Only in the case of *M. fruticulosa* is the lower lip margin sometimes tinted pale lavender or pink, but it is never as dark as *M. humilis*. The leaves of *M. humilis* are 2–4(5)cm long, while those of *M. punctata* are typically 4–7 mm long. As indicated by Torrey's epithet and by McClintock and Epling's (1942) reference to specimens belonging to this taxon as a "dwarf form," these plants are also much smaller (15–40(50) cm) and more gracile than typical *M. punctata*.

In addition to the morphological features, *M. humilis* has a different chromosome number than most other taxa in section *Cheilyctis*. *Monarda fruticulosa* and *M. punctata* vars. *arkansana*, *coryi*, *immaculata*, and *intermedia* all are $n = 11$ (Scora, 1967). The chromosome number of the midwestern and northeastern *M. punctata* var. *villicaulis* has been reported to be $n = 11$ or 12 (Bushnell, 1936; Scora, 1967; Gill, 1977). The chromosome number of *M. humilis* is $n = 12$ (as *M. punctata* var. *occidentalis*, voucher: Ward & Spellenberg s.n., 13 Aug. 1981 (NMC); Ward & Spellenberg, 1984).

Additional material seen: U.S.A. **New Mexico:** Sandoval Co., Santo Domingo Pueblo, *Abbott s.n.*, 10 July 1936 (UNM); McKinley Co., Zuni Indian Reservation, 1.5 mi. E of Blackrock, 0.5 mi. NE of Blackrock Reservoir, T10N, R18W, Sec. 18, *Brandt 1094* (UNM); Cibola Co., El Morro National Monument, *Carlson & McCallum SC4* (UNM); Cibola Co., T7N, R10W, Sec. 8, *DeBruin 448* (UNM); Socorro Co., T3S, R4W, Sec. 20, *Goodrow 522* (UNM); Socorro Co., plains E of Datil on hwy. 60, *Higgins 7737* (NMC); Socorro Co., between Datil & Magdalena on roadside, hwy. 60, *Jafoya 131* (UNM); Catron Co., North Cebollita Mesa, T8N R9W Sec. 8, *McIntosh 1006* (NMC); Socorro Co., 10 mi. S of Claunch on state hwy. 55, *Pase 3566* (NMC); Torrance Co., Cibola National Forest, Gallinas Mountains, Forest Road 458, *Pase 3621* (NMC); Socorro Co., Plains of San Augustin, 18 mi. W of Magdalena on hwy. 60 at mile marker 94, *Sivinski 4062* (UNM); Torrance Co., 3 mi. E of Gran Quivera, *Spellenberg et al. 3408* (NMC, US); Valencia Co., El Morro National Monument, *Vogt 7* (ARIZ); Gran Quivera National Monument, NW section of mall, *Toulouse s.n.*, 19 June 1940 (ARIZ); Socorro Co., 9 mi. W of Magdalena on hwy. 60, *Wagner 1192* (UNM); Cibola Co., 10 mi. S of I-40, E edge of Grant Malpais, roadside of NM-117, T8N, R9W, Sec. 6, *Ward & Spellenberg s.n.*, 13 Aug. 1981 (NMC); Cibola Co., mountains W of Grant's Station, *Wooton 310* (NMC); [Cibola Co.], Inscription Rock, *Wooton s.n.*, 1 Aug. 1892 (US-2); Grant Co., W of San Lorenzo, *Wooton s.n.*, 26 July 1906 (NMC, US-2); Socorro Co., near Catron Co. line E of Datil, along US hwy. 60, *Zimmerman & Zimmerman DAZ-ADZ 2746* (ARIZ).

SUMMARY OF *MONARDA* SECT. *CHEILYCTIS*

The genus *Monarda* (Lamiaceae) consists of 19 species that are distributed in North America from

the Rocky Mountains to the Atlantic Coast and from Canada to central Mexico. The six species of section *Cheilyctis* are distributed in eastern North America from the East Coast to western New Mexico, as far north as southern Canada, as far south as northern Mexico. The species of section *Cheilyctis* lack rhizomes, have elliptical to linear leaves, more or less foliar bracts, several verticillate inflorescences along each flowering stem, corollas that have a throat much shorter than the tube and a markedly arcuate upper lip, included stamens, 13-veined calyces with deltate lobes, and chromosome numbers of $n = 11$ or 12 (Prather et al., 2002). The taxa of the section are predominantly herbs, but one species is a shrub.

KEY TO THE SPECIES OF *MONARDA* SECT. *CHEILYCTIS*, ADAPTED IN PART FROM CORRELL AND JOHNSTON (1970)

- 1a. Plants fruticose or suffruticose perennials; stems densely leaved, average internode length between 1 and 3.5 cm.
 - 2a. Upper stems densely pilose with spreading hairs; leaf margins coarsely serrate from below the mid-lamina to the apex, abaxial surface pilose throughout; floral bract margins serrate from the mid to upper lamina; distributed near the southern Texas coastline *Monarda maritima*
 - 2b. Upper stems puberulent with appressed or recurved hairs; leaf margins entire to sparsely serrulate from the mid-lamina to the apex, abaxial surface canescent to pilose toward the leaf base; floral bract margins entire or rarely toothed; distributed in southern or south-central Texas.
 - 3a. Fruticose perennial; leaves linear, leaf indumentum canescent, leaf color cinereous, apex obtuse to acute; distributed in southern Texas *Monarda fruticulosa*
 - 3b. Suffruticose perennial; leaves linear-lanceolate, leaf indumentum puberulent to sparsely pilose, leaf color green, apex sharply acute; distributed in south-central Texas *Monarda viridissima*
- 1b. Plants herbaceous perennials or annuals; stems laxly leaved, average internode length between 3.5 and 8 cm.
 - 4a. Orifice of the calyx densely hirsute, completely enclosed by a dense tuft of hairs forming a cone above the opening; leaves broadly lanceolate, 6–8 cm in length, 1.5–2 cm wide; distributed in central Texas *Monarda stanfieldii*
 - 4b. Orifice of the calyx glabrous to bearded, not enclosed by hairs; leaves lanceolate to linear-lanceolate, 7 cm or less in length, 0.3–1.5 cm wide; distributed across the eastern half of North America and west to New Mexico.
 - 5a. Upper lip of corolla lavender to purple, unspotted, lower lip white with irregular purple spots and a nearly continuous

purple margin; leaves 2–4(5) cm long;
New Mexico endemic
. *Monarda humilis*

- 5b. Upper lip of corolla white, yellow, or pink, often with maroon spots, lower lip white, yellow, or pink with or without maroon spots and a margin the same color as the corolla background; leaves 4–7 cm long; distributed widely across the central and eastern half of North America *Monarda punctata*

The new species brings the total number of species in section *Cheilyctis* to six, but the rank of several taxa in section *Cheilyctis* has been disputed. Epling (1935) and McClintock and Epling (1942) recognized two species in section *Cheilyctis*, *Monarda fruticulosa* and *M. punctata*. In the former treatment, *M. punctata* was considered to have four subspecies, and in the latter it was treated as having eight. In the most recent comprehensive treatment, Scora (1967) treated the complex as a single species, *M. punctata*, with 11 varieties. More recently, Turner (1994) treated the *Monarda* of Texas and Mexico and recognized five species in the section: *M. fruticulosa*, *M. maritima*, *M. stanfieldii*, *M. viridissima*, and *M. punctata* with five varieties that occur in the region included in the treatment. *Monarda viridissima* was described in the interim between Scora's (1967) and Turner's (1994) treatments (Correll, 1968). Scora (1967) treated the other three species recognized by Turner as varieties of *M. punctata*. In a recent publication on the phylogeny of *Monarda*, Prather et al. (2002) recognized three species of section *Cheilyctis*, *M. fruticulosa*, *M. punctata*, and *M. viridissima*. However, recent field and herbarium studies have suggested that Turner's taxonomy of the section is more appropriate, and that varieties *maritima* and *stanfieldii* are best treated as species (see below).

Monarda punctata is a widespread and highly variable species. For discussions on the morphological variation and taxonomic treatment of the infraspecific taxa refer to Turner (1994) or Scora (1967). *Monarda humilis* is discussed above. The other four taxa, *M. fruticulosa*, *M. maritima*, *M. stanfieldii*, and *M. viridissima*, are narrowly distributed edaphic endemics found only in Texas.

Monarda fruticulosa is the only true shrub in the genus. It is also characterized by its linear, canescent leaves and young stems, and by its pink bracts. It is endemic to the sand plains of southern Texas in Brooks, Duval, Jim Hogg, Hidalgo, Kennedy, and Zapata counties. All authors (e.g., McClintock & Epling, 1942; Correll & Johnston, 1970; Turner, 1994) except Scora (1967) agree that

this well-marked taxon merits species recognition. Scora treated it as a variety of *M. punctata*.

Monarda viridissima and *M. maritima* are distinguishable from the other taxa in the section by their robust suffrutescent habit and fall blooming period. These two taxa may be closely related, but they can be easily distinguished. *Monarda maritima* has long (1–3 mm), spreading, pilose trichomes scattered along the stem and abaxial leaf surface while the pubescence of *M. viridissima* is composed of much shorter trichomes (≤ 1 mm). Furthermore, *M. maritima* has lanceolate, strongly serrate leaves, while *M. viridissima* has linear-lanceolate, entire to weakly toothed leaves. *Monarda maritima* is endemic to the Live Oak Belt of coastal southern Texas and occurs in Aransas, Kleberg, and Refugio Counties. Some authors have treated *M. maritima* as a variety of *M. punctata* (Shinners, 1953; Scora, 1967), but others have recognized it at the species level (Correll & Johnston, 1970; Turner, 1994). *Monarda viridissima* occurs in the Carrizo Sands of central Texas and has been reported from Bastrop, Caldwell, Goliad, Lavaca, Milam, and Wilson Counties. Field studies in spring 2001, in combination with herbarium studies, strongly suggest that both *M. maritima* and *M. viridissima* merit species recognition. Both species sometimes occur sympatrically with *M. punctata* and when they do, they remain morphologically and phenologically distinct (Turner, 1994; Prather, pers. obs.).

Monarda stanfieldii is characterized by a dense ring of stiff, erect trichomes at the apex of the calyx tube. These trichomes are found on the inner surface only. They project inwardly and form a cone that closes off access to the calyx orifice. Furthermore, this species has distinctly yellow flowers that have dense maroon spotting on the upper surface, and leaves that are longer and wider than most other taxa in section *Cheilyctis*. *Monarda stanfieldii* is endemic to the granitic sands of the upper Colorado River drainage in the Texas Hill Country and is found in Llano and Travis Counties. Like *M. maritima*, some authors have treated this as an infraspecific taxon in *M. punctata* (Scora, 1967; Correll & Johnston, 1970), but Turner (1994) recognized it at the species level. It is not known to occur sympatrically with any other taxon in the section. The appropriate rank for *M. stanfieldii* is problematic, but the dense ring of trichomes distinguishes the taxon from all other taxa, and serves as a putative autapomorphy; therefore it is our opinion that currently it is best treated as a species.

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